WHAT IS CLAIMED IS:

1. A rubber composition containing a filler comprising (a) 100 parts by weight of at least one rubber containing olefinic unsaturation, (b) 1 to 250 phr of a filler, and (c) 0.05 to 5.0 phr of zinc oxide particles having a diameter of less than 20 nanometers.

2. The rubber composition according to claim 1, comprising 0.1 to 1.5 phr of zinc oxide particles having a diameter of less than 20 nanometers.

3. The rubber composition according to claim 1, comprising zinc oxide particles having a diameter of less than 12 nanometers.

4. The rubber composition according to claim 1, characterized in that said filler comprises primary particles of silica particles having a diameter in a range of 5 to 25 nanometers which form at least partially clusters or aggregates having a diameter in a range of from 40 nanometers to 500 nanometers.

5. The rubber composition of claim 1 wherein said rubber containing olefinic unsaturation is selected from the group consisting of natural rubber, neoprene, polyisoprene, butyl rubber, halobutyl rubber, polybutadiene, styrene-butadiene copolymer, styrene/isoprene/butadiene rubber, methyl methacrylate-butadiene copolymer, isoprene-styrene copolymer, methyl methacrylate-isoprene copolymer, acrylonitrile-isoprene copolymer, acrylonitrile-butadiene copolymer, EPDM, silicon-coupled star-branched polymers, tin-coupled star-branched polymers and mixtures thereof.

6. The rubber composition according to claim 1, comprising at least one additional diene-based elastomer.

7. A sulfur-vulcanized rubber composition which is prepared by heating the composition of any of the claims 1 to 6 to a temperature ranging from 100°C to 200°C in the presence of a sulfur-vulcanizing agent.

8. An article of manufacture characterized by having at least one component comprised of the composition of any of the claims 1 to 7.

9. A tire characterized by having at least one component comprised of the composition of any of the claims 1 to 7.

10. A tire having a tread comprised of the composition of any of the claims 1 to 7.

11. A method of processing a rubber composition containing a filler comprising mixing (a) 100 parts by weight of at least one rubber containing olefinic unsaturation with (b) a mixture comprising 1 to 250 phr of a filler and 0.05 to 5.0 phr of zinc oxide particles having a diameter of less than 20 nanometers.

12. A method of processing a rubber composition containing a filler comprising mixing (a) 100 parts by weight of at least one rubber containing olefinic unsaturation, (b) 1 to 250 phr of a filler and (c) a mixture of 0.05 to 5.0 phr of zinc oxide particles having a diameter of less than 20 nanometers with a processing additive.

13. A method of processing a rubber composition containing a filler comprising mixing (a) 100 parts by weight of at least one rubber containing olefinic unsaturation, (b) 1 to 250 phr of a filler and (c) a masterbatch comprising 0.05 to 5.0 phr of zinc oxide particles having a diameter of less than 20 nanometers and at least one polymer.

14. The method according to claim 11, 12 or 13, characterized by using 0.1 to 1.5 phr of zinc oxide particles having a diameter of less than 20 nanometers.

15. The method of claim 11 wherein the processing additive comprises an oil, a wax, a fatty acid or a resin.

16. The method of claim 11, 12 or 13, wherein said rubber composition is thermomechanically mixed at a rubber temperature in a range of from 140°C to 190°C for a mixing time of from 1 to 20 minutes.